

Spaceborne Scatterometers and Microwave Radiometers in the Studies of Ocean-Atmosphere Interaction

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Spaceborne scatterometers are designed to measure ocean surface wind vectors and, therefore, ocean-atmosphere momentum flux, under both clear and cloudy conditions. The scatterometers on a series of European Remote Sensing Satellites (ERS) have provided surface wind measurements since 1991. The National Aeronautics and Space Administration (NASA) launched scatterometers NSCAT in 1996 and Quikscat in 1999, with continuous improvements in spatial resolution and coverage. The operational Special Sensor Microwave / Imagers (SSM/I) have monitored ocean surface wind speed, integrated water vapor (IWV), and rain since 1987. The Tropical Rain Measuring Mission (TRMM) Microwave Imager (TMI), which was launched in 1997 measures additional frequencies from which all weather sea surface temperature (SST) can be retrieved. Ocean surface evaporation or latent heat flux can be derived from the spacebased measurements of wind speed, IWV, and SST, or it can be retrieved directly from the radiances observed by TMI.

Three examples will be presented to show oceanic responses (as exhibited through spacebased SST and sea level changes) to surface wind and thermal forcing at different temporal and spatial scales - during the transition of a storm, the seasonal changes of monsoons, and an El Nino episode.